of the vomer. It appears that Uffenord first suggested the submucous removal and use of the membrane over anterior surface of the obstruction.

In April, 1915, Thomasson reported a case of unilateral bony occlusion operated by a submucous route. The chief feature of his operation was the formation of a mucous membrane flap to cover the wound in the floor. It, however, left three bare, bony surfaces to granulate and, moreover, is impossible of performance in such a case as the one I am to describe.

In January, 1915, a woman aged 35, presented herself at the Nose and Throat clinic of Stanford University, Medical Department. She complained only of deafness in the right ear and of some discharge for the last two months from the right nostril. Examination: Ear-catarrhal otitis media chr. Right ear. Nose—left side normal; right side full of muco-purulent material of a peculiar gelatinous consistency which she was unable to expel. By mirror post-nasally was seen a complete obstruction of the right choana which, on probing, was found to be hard. This extended from the floor to the sphenoid, and from the posterior end of the vomer to the lateral wall. Pus was seen under the middle turbinate after wiping the naris clean. In view of the history of a pneumonia two months before, and this discharge having supervened, I probe-punctured the right antrum and aspirated some pus which was cultured and the chief organism found to be the pneumococcus. What was the source of infection here since the closure of the choana prescribed the air as carrier?

Not having, at that time, seen any operation described except oblation of the obstruction, I thought of approaching it by the septal route, raising the mucosa from the anterior face of the obstruction and using the flap thus obtained to cover the bony wound in the floor and roof by splitting it transversely. The procedure was very easily carried out so far as the removal of the septum submucously and the dissection of my flap from the face of the obstruction. I found, however, that the removal of the bony wall was very difficult, owing to its thickness and the abnormal lowness of the sphenoid. Chiseling was difficult for the same reasons and also on account of the proximity of the Eustachian tube. Necessity forced the next step of the operation which was, in brief, to short circuit the air by removing a portion of the posterior end of the septum itself. This was done with a Wagner's forward-biting antrum punch, though other instruments could be used for that purpose. The opening thus made was adequate, has remained free, and has required no attention since.

The advantage of such an opening is that it has a tendency to enlarge up to a certain point and will not close in by granulations. While it is advisable to bite or drill out as much of the obstruction as possible, the essential part of the operation, after removal of the septal bone, is the formation of a new choana, as it were, by the removal of a portion of the posterior end of the septum. This simply shortens the length of the septal base. The illustration will make further description unnecessary.

One other point about this case may be of interest. On being tested by some of the essential oils, as to her sense of smell on the right side, after an opening had been established, it was found that she could detect the odor at once on inhalation; olfactory nerves were developed, although never used.

KIDNEY INFECTIONS IN WOMEN.*

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Anatomical differences in the female pelvic organs, as well as the physiological changes and the frequent pathological conditions associated with pregnancy and the puerperium, are factors of importance both in the etiology and treatment of renal infections. The shortness of the urethra, together with its closer proximity to the vagina and rectum, has a direct bearing upon the much greater frequency of colon bacillus infections in women, and when we consider that the majority of infections of the upper urinary tract are due to the latter organism, the importance of sex in relation to pathological conditions of the kidney is obvious. Likewise the intimate relationship existing between the venous and lymphatic plexuses of the female sexual and urinary organs is a factor of much significance.

The routes of infection are hematogenous, lymphogenous through the inter-communicating lymphatics of the kidney, ureter, bladder, pelvic organs and colon and by direct extension upward from the lower urinary tract. The hematogenous and lymphatic routes have been repeatedly demonstrated, while the fact of the far greater prevalence of these conditions in females in whom the urethra, vagina and rectum are in such close proximity lends support to the theory of direct infection.

Regardless of the manner in which bacteria gain access to the pelvis of the kidney, obstruction to the outflow of urine, traumatism or lowered resistance from some cause must be present in order that pathological conditions develop. Bacilli are constantly passing through the kidney and the urethral orifice is often bathed in purulent secretions without the development of renal lesions or urethritis. Strictures, distortions of the ureter due to displacement of the uterus and extraureteral pressure favor stasis and consequent infection. Stones in the kidney producing both obstruction and trauma lead to a similar result.

Infections of the upper urinary tract are probably always secondary, the primary focus being found in the intestinal tract in infections due to the colon bacillus, in the lungs when the tubercle bacillus is responsible and in the lower urinary tract, tonsils, ears, teeth or skin when the cocci are the offending organisms.

The majority of observers have found the colon bacillus first, the tubercle bacillus second and the coccus group last in order of frequency. In twenty-five of my own cases under recent obser-

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vation the colon bacillus was present eleven times, the coccus eight, the tubercle bacillus two and a mixed infection of colon bacillus and coccus four times. The cocci are more frequently seen in acute conditions although less common than the colon bacilli.

Although later almost complete destruction of the kidney may occur from diffuse inflammation the lesions produced by the colon bacillus are at first limited to the pelvis and tubules and are consequently productive of much pus in the urine. They are responsible for the conditions known as pyelitis, pyelonephritis or diffuse inflammation of the kidney without abscess formation and pyonephrosis. The coccus group on the other hand exert their influence upon the cortex and subcortex and pus is often absent from the urine. Circumscribed abscesses as well as diffuse suppuration, perinephritis and perinephritic abscesses are due to these organisms. A mixed infection caused by a combination of the above groups may occur at times and is often most confusing.

From a consideration of these facts the conclusion is drawn that the diagnosis of kidney lesions is obviously incomplete without a correct determination of the infecting organism. This is accomplished by the cultural examination of fresh urine, a procedure which is often neglected even by the urologist. While some authorities go so far as to claim that the nature of the infection may be ascertained by means of functional kidney tests, my experience with the combined phenolsulphonephthalein, intravenous phloridzin and urea tests in a large number of estimations leads to the conclusion that this is not always true as the amount of destruction of kidney tissue accompanying any type of infection is an important factor in the resulting values.

There is also a tendency at the present time to classify all cases of pyelitis as pyelonephritis. While it is probably true that the infectious process is never entirely limited to the pelvis I think the latter term should be reserved for those cases exhibiting sufficient parenchymal involvement to produce a diminished renal function and the former used when normal functional values are found.

The treatment of colon bacillus infections consists first in the correction of associated pathological conditions, either primary or secondary, after which measures directed toward the destruction of the bacillus are in order. There are a number of groups of colon bacilli, the members of which exhibit differences in cultural characteristics and in virulence. Corresponding to these groups we see four types of infections varying in accordance with their resistance to treatment. The first type clears up after one or two ureteral catheterizations, probably through the relief of some slight obstruction. The second runs a course of from two to four weeks before recovery, while the third becomes chronic. The fourth type, an acute unilateral virulent infection is rapidly fatal without nephrectomy.

Drainage of the pelvis through the ureteral catheter, together with the proper adjustment of the reaction of the urine by the administration of drugs increasing or decreasing its acidity or alkalinity, following the recently advocated determination of the range of acid production of the bacillus, are of most value. Pelvic irrigations with one-half to one per cent. silver nitrate solutions and urinary antiseptics such as hexamethylenamin internally are also beneficial. The latter drug, however, is usually given in too small doses. As much as two grams may be given every four hours without deleterious effects. It is also to be remembered that urotropin is valueless in urine not decidedly acid, consequently frequent determinations should be made not only of the reaction of the urine but also for the presence of formaldehyde.

Nephrectomy is necessary in virulent unilateral hematogenous infections and in cases where other measures are of no avail and the patient is rapidly going down hill.

On account of the tendency to abscess formation and because of their location in the vicinity of the cortex precluding amenability to medical therapy the treatment of coccus infections is usually surgical. Whereas incision and drainage are usually sufficient in perinephritic abscess with little or no renal involvement, nephrectomy is the operation of choice where the latter condition exists. Partial nephrectomy, decapsulation and incision and drainage of kidney abscesses is seldom of permanent benefit although in cases of extensive bilateral abscess formation when the question arises as to the better kidney containing sufficient functionating tissue to preserve life the operation of partial nephrectomy is of value. A patient upon whom I performed a double partial nephrectomy five years ago because of a bilateral calculus pyonephrosis with extensive destruction of renal parenchyma is working twelve hours a day and apparently enjoying perfect health, although the urine from both kidneys contains numerous pus cells.

The treatment of tubercular infection of the kidneys is by nephrectomy except in the presence of more or less extensive bilateral involvement. Here careful tuberculin therapy together with appropriate general measures are occasionally of value.

The following cases present features of special interest:

Mrs. B., a married woman thirty-eight years of age, entered the hospital complaining of deafness, burning during urination and dryness of the mouth. Her illness had begun fourteen days previously with fever, chills particularly at night, nosebleed, diarrhoea and a sharp pain in the right lumbar region extending around to the abdomen and left breast. Seven days later urination became intensely painful and deafness appeared. A provisional diagnosis of typhoid fever was made by the intern and the patient placed in the contagious ward. Examination three days later revealed a large tender movable right kidney and on account of the uncertainty in diagnosis the ureters were catheterized for the purpose of obtaining urine for microscopical examination, culture and the performance of functional tests. The bladder walls, sphincter and ureteral orifices were normal. The intravenous phlorizin and phenolsulphonephthalein as well as the quantitative urea tests

showed equal values on both sides. Microscopically the urine from the right kidney showed numerous pus cells and from the left an occasional pus cell. Cultures from both urines showed colon bacilli. Radiographs were negative for calculi. Urotropin and acid sodium phosphate were given internally. Two and again three weeks later the pelves were lavaged with one half per cent. silver nitrate solution. Two days after the second lavage the general and local symptoms as well as her hearing had greatly improved. She was discharged four days later in apparently normal condition. The question of diagnosis was of interest in this case also the temporary deafness accompanying the infection. The cause of the latter symptom was not determined.

The next case, also one of colon bacillus infection, is illustrative of the chronic type:

Mrs. B., thirty-one years of age, the wife of a physician, complained of frequency of urination, pain in the left lumbar region, nausea and vomiting and cloudy urine. These symptoms recurred every five to ten days and lasted from six to twelve hours. The first attack appeared thirteen years ago and at that time recurred at intervals of three months. Four years ago, shortly after conception, the patient had a severe attack of three months' duration which improved under appropriate treatment. Repeated attempts at catheterizaiton of the left ureter were futile, the catheter meeting an obstruction, due to stricture, one and a half centimeters from the bladder. Chromoureteroscopy with indigo carmine injected intramuscularly showed the characteristic blue discoloration at the right ureteral orifice in six minutes but none appeared on the left side in one half hour. Microscopical and guinea-pig tests for tubercle bacilli were negative. Urine from the right kidney was normal. The bladder urine contained numerous pus cells due to colon bacillus infection.

Following an uneventful confinement three and a half years ago the patient was free from symptoms for several months but they returned with increasing frequency until at the present time the attacks occur at least once a week. She now also complains of occasional slight pains in the right lumbar region. An attempt to catheterize the left ureter with a fine-pointed catheter proving successful, comparative functional tests were instituted with the following results:

	Right Kidney	Left Kidney
	Phlorizin (intravenous injection)	
Appearance	5½ minutes	None in one-half hour
	Phenolsulphonephthalein	
Appearance	3 minutes	Faint trace in eleven minutes
Amount	15%	Very faint trace
	Urea	
	.003	None

Right Kidney	Left Kidney
Microscopical Examination	
A few small round epithelial cells	Large number of pus cells, single and in clumps
Culture	
Negative	Pure colon bacillus

Pyelography with thorium nitrate showed a large shadow in the left kidney region which was considered due to a pus sack replacing the kidney parenchyma, this diagnosis being apparently substantiated by the negative functional values. Exposure of the kidney, however, revealed an enormously dilated pelvis and upper ureter, but also a large amount of microscopically normal parenchyma. A number five catheter entered the bladder readily from above. In view of these findings an attempt to save the kidney was considered justifiable and a large drainage tube was inserted into the pelvis. Before closure of the wound the kidney was fixed in a position favorable to drainage by sutures through the capsule. The wound having healed the patient left the hospital in three weeks much improved. It is now possible to pass a number six catheter through which drainage and lavage of the pelvis is accomplished. The patient is free from subjective symptoms although the urine from the left kidney still contains pus cells and colon bacilli. Functional tests give the following results:

	Right Kidney	Left Kidney
	Phlorizin (intravenous injection)	
Appearance	5 minutes	20 minutes
Amount	1.0	Trace
	Phenolsulphonephthalein	
Appearance	3½ minutes	25 minutes
Amount	18%	Trace
	Urea	
	.002	.001

The next case is an example of tubercle bacillus infection, interesting from a diagnostic standpoint:

Mrs. G., a well-nourished woman forty-four years of age, complained of frequency of urination and pain in the right lumbar region radiating to the hypogastrium. The symptoms had begun one and a half years ago. Urine from the right kidney contained many pus cells, that from the left was negative. Functional tests showed equal values on both sides. Radiography disclosed two shadows in the right kidney region and pyelography revealed a moderate distension of the right renal pelvis. A diagnosis of nephrolithiasis was made. At operation no stones were found but two circumscribed cavities were present in the lower pole of the kidney. The pathologist reported chronic tuberculosis. Although excusable the mistake in this case could have been avoided if careful examination for tubercle bacilli had been made.

The following case of coccus infection is illustrative of that type in which nephrectomy is indicated:

Mrs. L., married, thirty-one years of age, complained of pain in the right hypochrondriac region. The present illness began two years ago at which time she fell down stairs striking on her right side. A slight persistent ache followed this accident. Two months later distinct pain appeared and she began to feel tired. The pain was severe at times compelling her to sit down. A year later she noticed a mass in the right side. For the last few months she has been obliged to urinate two or three times during the night. She has become much weaker recently and has been obliged to remain in bed for several days at a time.

Palpation revealed a tender movable mass the size of the palm of the hand in the right hypochondriac region. Cystoscopy was negative. The urine from the right kidney contained many pus cells and gram positive diplococci. Functional tests showed a marked decrease in value on this side. As no improvement resulted from conservative treatment and the patient was rapidly going down hill nephrectomy was considered advisable. Recovery was uneventful following operation. The pathologist reported diffuse inflammation due to gram positive diplococci.

The above cases illustrate the necessity of a careful examination of the upper urinary tract before the question of treatment is considered. This is possible only after considerable training in urological technique and an amount of time and patience seldom required by other lines of special medical work. Too much emphasis cannot be laid upon the necessity of ascertaining the nature of the organism responsible for the infection.

In New Haven, Bridgeport and other Connecticut towns milk delivered at the station is sold wholesale at 8 cents a quart. It retails as high as 15 cents a quart. In Waterbury, when the price was raised from 12 to 15 cents a quart the sale was so greatly reduced that the price has been dropped back to 14 cents.